2024-2025

WATERFOWL PROJECT REPORT

SOUTH CAROLINA DEPARTMENT OF NATURAL RESOURCES

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STATEWIDE WATERFOWL BIOLOGIST

Molly Kneece has served as Statewide Waterfowl Biologist for South Carolina Department of Natural Resources (SCDNR) since fall of 2021 and has been an employee of the agency in waterfowl management for nine years. She brings 14 years of wetland and waterfowl management experience to SCDNR but her interest in natural resources, land management and wildlife began at an early age.

Kneece's formal waterfowl career began in 2011 in the tidal marshes and coastal impoundments of the ACE (Ashepoo, Edisto, Combahee) Basin of South Carolina. As a field technician for the Nemours Wildlife Foundation (Yemassee, SC), Kneece worked on the first research project to investigate mottled duck habitat selection and nesting ecology in South Carolina. Looking to further her career and gain valuable waterfowl management experience, she obtained a Master of Science in Waterfowl Ecology and Management (2016) at Mississippi State University. During her studies, Kneece developed and completed a research project investigating survival, breeding and brood-rearing ecology of mottled ducks in the tidal impoundments of coastal South Carolina. While completing this research in SC, Kneece had the opportunity to work alongside and learn from some of the most tenured and successful waterfowl habitat managers on private, state, and federally owned properties in the ACE Basin. With experience gained in the field and through her degree studies, Kneece developed a unique skill set--learning the art and science of managing habitat for waterfowl in brackish and moist soil wetlands in coastal South Carolina.

As Statewide Waterfowl Biologist, Kneece's duties are to:

1. Provide technical assistance and habitat management guidance to support SCDNR field staff working on agency waterfowl areas and public waterfowl hunting areas.
2. Implement a waterfowl management area review program that evaluates wetland habitats, management regimes, infrastructure, and waterfowl hunt programs on all SCDNR waterfowl properties.
3. Assist with the implementation and evaluation of the Waterfowl Lottery Hunt Program by seeking ways to increase public hunting opportunities, enhance existing public hunting areas, and establish new waterfowl hunting areas.
4. Represent interests of the state of South Carolina and the agency on the Atlantic Flyway Council Technical Section.
5. Provide leadership and guidance for the annual selection of migratory bird hunting regulations.
6. Develop standard monitoring programs and coordinate research for waterfowl issues of management concern.
7. Provide educational opportunities and technical assistance for state and federal agencies, and public constituent groups.
8. Cultivate relationships with constituent groups through updates and outreach to foster good rapport and support for waterfowl in South Carolina.

STATEWIDE WATERFOWL BIOLOGIST REPORT

At quarterly meetings of the Waterfowl Advisory Committee, Biologist Kneece provides an overview of activities completed and in progress as they relate to the State Waterfowl Program. The following is an overview of those activities from July 1, 2024 through June 30, 2025:

TECHNICAL ASSISTANCE & HABITAT MANAGEMENT GUIDANCE

Kneece completed 27 site visits to Category 1 Waterfowl Areas to observe habitat conditions and provide technical guidance on habitat management and infrastructure projects. Two visits were made to Category 2 Waterfowl Areas at Hickory Top to discuss management of habitat openings with the Greentree Reservoir (GTR) and control of nuisance vegetation. A visit was made to Category 2, Santee Cooper WMA to investigate possible control of aquatic nuisance vegetation, habitat openings, and options for reducing disturbance of waterfowl on the area during the hunting season. For public waterbodies, Kneece reviewed wood duck box placement and production reports for Federal Energy Regulatory Commission licensing requirements of the 99 Islands and Gaston Shoals Hydroelectric Facilities.

THE WETLAND REVIEW PROGRAM

A final report of findings for Santee Coastal Reserve. This report can be found at: https://www.dnr.sc.gov/hunting/waterfowl.html. Piedmont waterfowl properties, Clemson, Beaverdam, and Broad River were selected for evaluation by the Waterfowl Area Review Program in Fall 2025. Kneece has been assisting staff to prepare for the reviews. Kneece has also been working to select three panelists with considerable experience growing agricultural crops and managing moist soil for waterfowl, and having infrastructure design experience with consideration of dynamic topography and abundant sedimentation in wetland systems.

WATERFOWL LOTTERY HUNT IMPLEMENTATION

During the 2024-25 waterfowl season, Kneece attended 8 waterfowl lottery hunts to interact with lottery hunters. Kneece also collaborated extensively with field and GIS staff to develop a digital data form to collect and enter harvest results from the field. The goal was to produce a digital data form that increased efficiency of data collection and review for staff, and to produce a tool that will provide an interactive dashboard for the public to examine harvest results for each lottery hunt property. The public dashboard is expected to be available on the SCDNR webpage for the 2025-2026 waterfowl season.

ATLANTIC FLYWAY COUNCIL TECHNICAL SECTION

Kneece attended two in-person meetings and six virtual meetings to represent interests of the state of South Carolina and the agency on the Atlantic Flyway Council Technical Section. Relevant topics for the previous year include: How to improve and continue waterfowl monitoring programs in the face of reducing federal budgets; Season framework recommendations for 2025-2026; Assessments of Mississippi and Atlantic Flyway wood duck banding objectives; History of captive reared mallards; Atlantic Flyway mallard research; Creating a more efficient system for approval and publishing of state selected migratory bird seasons by the USFWS.

SELECTION OF MIGRATORY BIRD SEASONS

Kneece and staff developed 2025-26 Migratory Bird Hunting Season recommendations based on season framework recommendations of Multi-Stock Adaptive Harvest Management strategies adopted by the USFWS in fall 2024. Staff recommendations were presented to the Waterfowl Advisory Committee and Wildlife and Freshwater Fisheries Advisory Committee for comment. With support from both Advisory Committees, the SCNDR Board approved the recommended seasons on March 25, 2025. USFWS approval of state selections of 2025-2026 Migratory Bird Hunting Seasons were published to Federal Register (Vol. 90, No. 162) on August 25, 2025.

DEVELOP & COORDINATE STANDARD MONITORING PROGRAMS & RESEARCH

Kneece coordinated numerous monitoring programs for habitat, waterfowl abundance, public use, and lottery hunt results. Details of these monitoring programs can be found throughout this report. Kneece also coordinated the state-wide waterfowl banding program. From July-September 2024 (pre-season banding), staff banded 905 ducks (686 wood ducks, 207 mottled ducks, 12 black-bellied whistling ducks). From February-March 2025 in conjunction with research projects, staff banded 187 ducks (115 American green-winged teal, 41 blue-winged teal, 1 gadwall, 2 American wigeon, 18 mallards, and 10 wood ducks). Kneece and staff also have collaborated to develop a standardized data form to use in monitoring wood duck boxes on WMAs and the Santee Cooper Lakes. The new digital form is being field tested in summer-fall 2025. It will allow staff to enter data from the field and enable efficient analysis of summary statistics.

Kneece has also coordinated participation and data collection for three research projects: Migration Ecology of Demographics of Eastern Mallards (see Research Updates), Establishing Origins of Atlantic Flyway Mallards (see Research Updates), and Dr. Phil Lavretsky's (UTEP) analysis of the abundance of game farmed mallard genetics in mallards and American black ducks harvested in SC. In-kind support and property access was coordinated for numerous research projects, in addition to assistance with data collection. Literature reviews were completed on the impacts of solar farms on wetland dependent species and current wood duck box management recommendations. Kneece also attended the Clemson University Kennedy Center Advisory Committee to receive updates on student research and collaborate with partners to develop new research ideas relevant to SC and the south Atlantic region.

EDUCATION & COLLABORATION FOR STATE AND FEDERAL PARTNERS

Kneece was invited to present at the Annual USFWS/SCDNR Coordination meeting in July 2024. Biologists from both agencies were briefed on the technical application of rapid habitat assessments for waterfowl and current procedures for mid-winter waterfowl surveys. Application of habitat assessments and partnership was encouraged to highlight the importance of quality waterfowl habitat management on both state and federal waterfowl areas in South Carolina.

OUTREACH

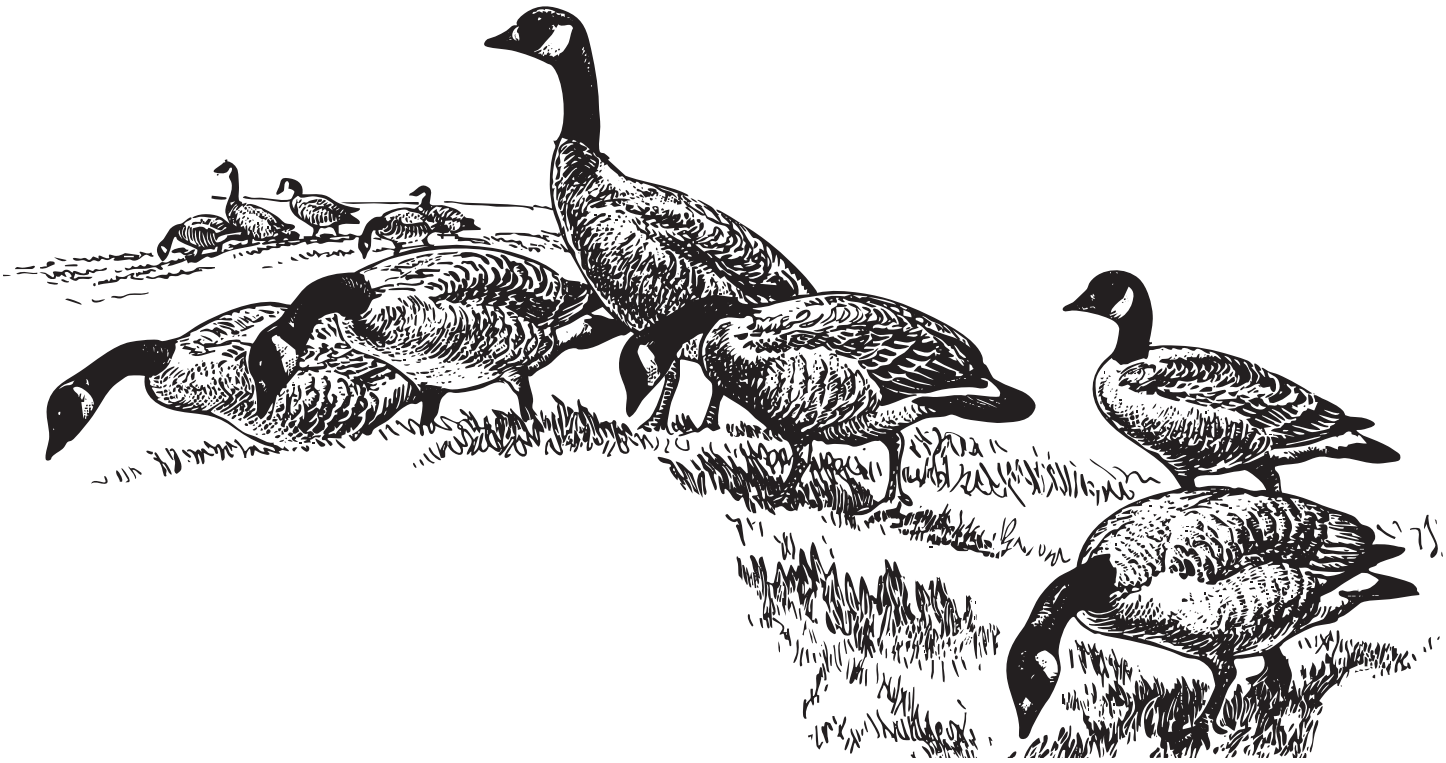
Biologists Kneece and Treptow were invited in October 2024 to represent the Agency at “Explore Charleston—Wings Over Water”. This was a joint event sponsored by the Charleston Visitors Bureau and the Charleston Chapter of Ducks Unlimited. The event highlighted the importance of wetlands to the greater Charleston area and promoted conservations partnerships. Kneece spoke to the group of 75 about the importance of wetlands for humans and wildlife, and promoted the many SCDNR waterfowl areas located in Charleston and neighboring counties.

ADDITIONAL ACTIVITIES

In cooperation with Small Game Program staff and Education, Outreach and Information staff, SCDNR Migratory Bird webpages were redesigned and updated. All dated information was removed and new, relevant information added to better inform the public of Waterfowl Program activities and information.

A minimum of 26 calls related to duck or goose issues were addressed. Consulted with law enforcement on two waterfowl cases.

Represented state and Agency interests on the Atlantic Coast Joint Venture, Black Duck Working Group. Two virtual meetings focused on challenges with permitting wetland restoration work and habitat enhancement needs.



RESEARCH UPDATES

MIGRATION ECOLOGY AND DEMOGRAPHICS OF EASTERN MALLARDS, 2022-2026

South Carolina Department of Natural Resources has partnered with 22 agencies, including state natural resources agencies, the U.S. Fish and Wildlife Service, the Canadian Wildlife Service, Ducks Unlimited, University of Saskatchewan (USASK), State University of New York (SUNY) Brockport, and a private landowner group to study the migration ecology and reproductive parameters of eastern mallards in the United States and eastern Canada.

The eastern mallard breeding population is comprised of those individuals breeding in the Northeast US and eastern Canada. In the mid-1990s, eastern mallard breeding populations (BPOP) peaked at approximately 1.4 million (USFWS 2019). Since that time, the eastern mallard BPOP declined 23%, with the Northeast US sub-population down 49% and eastern Canada sub-population up 23%. However, from 2010-2025 the population has plateaued or is relatively stable(-2.6%).

To develop greater understanding of eastern mallard population dynamics and to manage this population more effectively, managers need more reliable estimates of productivity, brood survival, and seasonal survival at sub-population scales. Using locations from hen mallards outfitted with GPS transmitters, researchers will monitor daily survival and behavioral patterns, habitat use, nest locations and success, and movements. Using drone technologies, researchers will also evaluate daily survival of broods with hens having GPS transmitters. Using this information, researchers will gain critical knowledge of eastern mallard habitat use and selection during the breeding season. All location information will be valuable for property managers looking to improve breeding, staging, and wintering habitat throughout the Atlantic Flyway. Seasonal survival and production metrics will provide biologists with information to evaluate the performance of harvest strategy models used to recommend hunting season lengths and bag limits in the Atlantic Flyway.

Field season will occur from late winter to early spring 2022-2026 to deploy GPS transmitters on female mallards in eastern Canada and Atlantic Flyway states. These transmitters are solar battery-powered units and can provide researchers location information for up to two years, given survival of the hen mallards. During the 2023-2025 field seasons, biologists also captured additional female mallards to outfit with geolocators. These are very small units that attach to a leg band and record ambient light and time data. Unlike GPS transmitters, the mallards outfitted with geolocators must be harvested or recaptured to obtain data from the unit. These special units were added to the study to evaluate the possible effects of transmitters on nest propensity (i.e. the proportion of hens that nest) and nest success.

Since February 2022, 1,263 transmitters have been deployed in 14 states and 3 Atlantic Cananda Regions. As of February 2025, 20 GPS transmitters have been deployed on female mallards in South Carolina. All individuals marked in SC were captured on private land in Kershaw, Spartanburg, and Greenwood Counties. As of June 2025, preliminary data indicates that 3 hen mallards remain alive, 2 have been harvested, 8 are considered missing (i.e. have not reported locations in > 3 months), and 7 are confirmed mortalities. Migration movements from February 2022-June 2025 of marked individuals emphasize the importance of the Great Lakes and Southern Ontario regions for mallards that winter in South Carolina (**Figure 1**).

During the study, 1,176 geolocators have been deployed on female mallards in each state and the Atlantic Canada Region, except South Carolina. SCDNR deferred attachment of geolocators to prioritize attachment of GPS transmitters. Over the 2023-24 and 2024-25 seasons, 53 geolocator have been recovered via hunting or banding operations. Two geolocator marked mallards were harvested by hunters in South Carolina during the 2024-25 season. The first geolocator was recovered in Florence County. This mallard was marked in February 2024 in Maryland. The second geolocator was recovered in Spartanburg County and was marked in March 2024 in Ontario. Unfortunately, the geolocator from Ontario was no longer attached to the band on this mallard; therefore, data from this unit is unavailable to researchers.

February 2026 will mark the final field season for outfitting mallards with GPS transmitters. Participating states will attempt to deploy 67 remaining units, with 12 of those units being targeted for deployment in South Carolina.

Two Master of Science candidates at SUNY Brockport under the direction of Dr. Jacob Straub, are working toward completing theses and peer-reviewed publications. Daria Sparks is investigating, “Migration Chronology and Winter Habitat Use of Mallards in the Atlantic Flyway” and is projected to complete her thesis in Fall 2026. Sparks is currently drafting a chapter on migration chronology that indicates about one-third of tracked mallards employed a non-migratory strategy at least once. These mallards were concentrated between 42-45° N in areas supportive of year-round survival. Abbey Bulter is completing a thesis, “Monitoring Mallard Brood Habitat Use and Survival in the Atlantic Flyway” and is projected to be completed in Spring 2026. Bulter’s current work indicates stable nest success (24.4%) for the four years of study. The 2025 breeding season nest success was 23.7%. Preliminary habitat-use analysis suggests that successful broods occupy more cropland and urban areas.

Cassidy Waldrep, a PhD. candidate at the University of Saskatchewan, under the direction of Dr. Mitch Weegman, will produce a dissertation titled “Eastern Mallard Migration, Population, and Behavioral Ecology.” Manuscripts from Waldrep’s work are projected for completion each fall and spring from 2025-2027. Waldrep currently has a manuscript in-prep on “Assessing daily survival post-transmitter attachment in eastern mallards” where she determined that temperature strongly influences early mortality in mallards outfitted with GPS transmitters.

Future publications from the culmination of data from the eastern mallard research will make great contributions to our understanding of mallard ecology in Atlantic Flyway and will contribute to habitat management decisions and the revision of hunting season frameworks (i.e. season length and bag limit).

ESTABLISHING ORIGINS OF ATLANTIC FLYWAY DABBLING DUCK HARVEST

Dr. Michael Schummer of SUNY College of Environmental Science and Forestry, in collaboration with Nemours Wildlife Foundation and Environment Climate Change Canada have developed a Master of Science study “Establishing origins of Atlantic Flyway dabbling duck harvest using stable isotope and band vector analysis.”

Dabbling duck species comprise a substantial portion of the harvest for many Atlantic Flyway states. In the south Atlantic region, American green-winged teal, gadwall, and American wigeon typically make up a greater proportion of the harvest than mallards. In the mid-Atlantic

and northern states, these same species also contribute to a considerable proportion of early season harvest, prior to the arrival of mallards and black ducks. Combined, the harvest of American green-winged teal, gadwall, and American wigeon make up less than 20% of annual harvest in the Atlantic Flyway. Breeding densities of waterfowl in eastern Canada are typically low; however, they may contribute more to Atlantic Flyway harvest than detected by annual surveys or banding.

Current survey methodologies provide little information on abundances that may originate from eastern Canada and population estimates for gadwall and wigeon are not reported for eastern North America. Pre-season banding data is also limited for species in this region due to logistical challenges across such a vast and inaccessible area. Therefore, this study will use stable isotope analysis informed by winter banding data to determine the relative origins of American green-winged teal, gadwall, and American wigeon across their breeding range to estimate percentages and origins wintering in the Atlantic Flyway. This study will provide information that is not available through traditional survey and banding methods and will provide a greater understanding of mid-continent vs. eastern Canada contributions to the abundance of these species harvested in the Atlantic Flyway.

In winter 2024-25 and 2025-26, researchers will collect feather samples (American green-winged teal, gadwall, American wigeon) from the USFWS Parts Collection Survey and partners from New York to South Carolina. These feathers will be used for isotope analysis. Using winter banding and recovery data, ducks will be placed into an origin category (east or west of James Bay) as a weighting method for isotope results.

South Carolina Department of Natural Resources contributed a total of 141 wings (74 AGWT, 43 GADW, 24 AMWI) from the species of interest for isotope analysis. Staff collected one wing from each hunter harvested duck of the species of interest from Santee Coastal Reserve. A total of 159 ducks (115 AGWT, 41 BWTE, 1 GADW, and 2 AMWI) were banded at the Tom Yawkey Wildlife Center in contribution to the banding vector portion of the study. We will continue wing collections and winter banding in winter 2025-26 in contribution to the study.

2024-25 WATERFOWL LOTTERY HUNT PARTICIPATION AND HARVEST RESULTS

Category 1 waterfowl areas are available to hunters only by special permit obtained through the SCDNR Lottery Hunt Program. These areas are managed to attract and hold ducks for the duration of the waterfowl season and disturbance is managed by limiting hunting days. During the 2024-25 waterfowl season, Category 1 Waterfowl Lottery Hunts were administered on 10 WMAs: Beaverdam Creek, Bear Island, Broad River, Clemson, Donnelley, Sandy Beach, Samworth, Santee Coastal Reserve, Santee Delta (East and West), and Wateree River HP.

The 2024-25 waterfowl season provided 107 lottery waterfowl hunting opportunities for 1,104 individuals. This season we experienced two notable winter weather events that produced hazardous travel conditions. Out of precaution for public safety on these WMAs during these events, six lottery hunts were cancelled on the following WMAs: Beaverdam Creek (1); Broad River (1); Clemson (1); Sandy Beach (1); and Santee Coastal Reserve, Cedar Island (1) & Murphy Island (1). These cancellations reduced overall potential participation for 51 hunters. Those affected by cancellations had their preference points restored. We experienced an 87% participation rate for lottery waterfowl hunts across all sites (**Table 1**). Clemson and Donnelley WMA's have been part of the Youth Waterfowl Lottery system since 1995-96 and 1992-93, respectively. In effort to increase public use, the 2024-25 hunts on those sites were included as part of the general waterfowl lottery hunt system. When comparing the average youth hunt participation from the previous three seasons to hunter participation in 2024-25, participation increased on both sites (Clemson +35%, Donnelley +10%; **Table 2**).

Since the1998-99 season, waterfowl hunters have enjoyed a six duck per day bag limit. The long-term ducks per hunter harvest average (with a six-duck bag limit) for all Category 1 hunt sites is 3.1 ducks/hunter. The 2024-25 harvest average of 2.8 ducks per hunter on for all Category 1 lottery hunt properties is comparable to the long-term average (**Figure 2**). The top five species of harvest were green-winged teal (26%), gadwall (13%), blue-winged teal (11%), northern shoveler (11%), and northern pintail (7%). **Table 3** reports harvest composition and harvest averages by property for the 2024-25 season.

YOUTH WATERFOWL LOTTERY HUNTS

During the 2024-25 waterfowl season, 17 youth waterfowl hunts were conducted through the Lottery Hunt Program and provided opportunities for 83 youth hunters. Bonneau Ferry WMA provided weekly hunting opportunities throughout the season, whereas Bear Island, Beaverdam Creek, Broad River, Clemson, Donnelley, Santee Coastal Reserve, Sandy Beach, and Wateree River HP WMAs provided opportunities on the first Federal Youth Waterfowl Hunting Day in February. We observed an 81% participation rate for youth lottery waterfowl hunts, comparable to the 84% participation during the 2023-24 season.

The 2024-25 ducks per youth hunter harvest average was 2.5, comparable to the 2.8 ducks per youth hunter average in 2022-23. The top five species of harvest on youth hunts were ring-necked duck (23%), wood duck (20%), green-winged teal (16%), gadwall (12%), and northern shoveler (8%). Table 4 reports harvest composition and harvest averages for youth hunts by property for the 2024-25 season.

MIDWINTER AERIAL SURVEYS FOR WATERFOWL

In Winter 2025, SCDNR partnered with the USFWS to complete a mid-winter waterfowl survey on the following properties: Bear Island WMA, Samworth WMA, Sandy Beach WMA, Santee Coastal Reserve WMA, Santee Delta WMA, and the Tom Yawkey Wildlife Center (hereafter, Yawkey). Surveys were also conducted on Cape Romain, Hollings-ACE Basin, Santee, and Savannah NWRs. USFWS pilots and biologists conducted the survey using USFWS aircraft equipped for overwater surveys. One SCDNR staff member also participated in the survey to gain aerial survey experience and training.

Surveys were conducted on January 28-30, 2025. An estimated 34,889 waterfowl were counted on SCDNR surveyed properties. Dabbling ducks (88%) comprised the majority of estimates, followed by diving ducks (12%). Teal (combined green-winged and blue-winged teal; 46%), pintail (23%), and northern shoveler (12%), comprised most dabbling ducks. Ring-necked ducks (59%) and ruddy ducks (30%) comprised the majority of diving ducks. Santee Coastal Reserve (59%) and Yawkey (32%) reported the highest waterfowl abundances. Compared to 2024 results, total waterfowl abundance declined 41%, dabbling ducks 39%, and diving ducks 48%. **Table 5** reports the abundance of waterfowl by WMA and guild as estimated during the survey.

The decline in abundance from 2024 to 2025 may be attributed to the winter weather event that occurred the week prior to the survey on January 21-22, 2025. Counties in the coastal plain experienced snowfall, with some areas seeing accumulations of several inches. Many coastal impoundments were partially or completely frozen. Increased hunting pressure and disturbance surrounding waterfowl impoundments immediately adjacent to public waterways, and movement of waterfowl seeking shallow open water may have attributed to the decline in waterfowl counts in 2025.

South Carolina Department of Natural Resources will continue to partner with the USFWS to implement the mid-winter waterfowl survey in January 2026.

A complete history of mid-winter waterfowl surveys and current methodology can be found in the 2023-2024 Waterfowl Program Report: https://www.dnr.sc.gov/hunting/waterfowl.html.

GROUND COUNT SURVEYS FOR WATERFOWL, 2024-2025

During the 2024-2025 waterfowl season, ground surveys were conducted to document the abundance of ducks using lottery hunt properties throughout the waterfowl hunting season. Surveys were completed weekly, or once every two weeks as part of routine preparations for lottery waterfowl hunts. By integrating the surveys into pre-planned activities such as scouting or monitoring of water levels, staff were able to conduct surveys with no additional disturbance to hunted areas.

Counts were conducted on the following waterfowl areas: Beaverdam Creek, Bonneau Ferry, Broad River, Clemson, Donnelley, Love Farm, Samworth, Sandy Beach, Santee Delta East, and Wateree River HP/WMA. Ground surveys were omitted from Bear Island and Santee Coastal Reserve WMAs due to the size and distribution of impoundments on these properties; Ground counts would create additional disturbance and have high potential for double counting ducks that flush between impoundments along survey routes. Therefore, abundance estimates for Bear Island and Santee Coastal Reserve were obtained through the MWS (see Midwinter Aerial Surveys for Waterfowl).

Ground surveys were initiated during the week of Dec. 8, 2024, and continued through Jan. 31, 2025. Staff were instructed to estimate the number of waterfowl that they could see on each managed wetland and to avoid intentionally flushing any waterfowl for the purpose of obtaining a complete count. Therefore, these counts are considered minimum abundance estimates for each area.

Over the eight-week survey period, 60 ground surveys were completed on 11 waterfowl areas. Significant rainfall events during the first week of January resulted in severe flooding of Clemson, Beaverdam, and Broad River waterfowl areas. River flooding during the second week of January prohibited access to Santee Delta East. In these locations, staff were restricted from safely accessing these areas and surveys were not completed. Wateree River HP WMA and Love Farm WMA were hunted twice, every other week. Therefore, surveys on those properties were only conducted during the weeks they were hunted in effort to minimize unnecessary disturbance to those areas.

During the season, a total of 13,889 ducks were counted on the 10 waterfowl areas included in the survey. This is a 15% decline from the 2023-2024 ground count surveys (16,347). However, we also conducted five fewer surveys in 2024-2025. Abundances varied greatly by week and property (**Figure 3**).

These surveys will resume for the 2025-26 waterfowl season.

MIGRATORY WATERFOWL PERMIT BUDGET & EXPENDITURES, FY25

The South Carolina Migratory Waterfowl Permit, commonly referred to as the "SC Duck Stamp" is a $15.50 licensing requirement for resident and non-resident waterfowl hunters in South Carolina. A 10% portion of annual permit revenue is allotted to the Association of Fish and Wildlife Agencies' Fall Flight Program. This program is administered through Ducks Unlimited Canada where funding is used for the propagation, management, and protection of ducks and geese on breeding ground areas associated with waterfowl that winter in South Carolina. Beginning July 1, 2026, and for succeeding years, 20% of annual SC Duck Stamp permit revenue will be allotted to the Fall Flights Program. The remaining annual revenue generated from the purchase of the duck stamp is allocated to SCDNR specifically for the management of waterfowl habitats and for the development, protection, and propagation of wild waterfowl in South Carolina. Each year, in addition to annual budget requests, staff managing waterfowl properties request additional state duck stamp funding for special projects, habitat management, infrastructure improvements, and research on waterfowl areas. **Table 6** summarizes duck stamp funding requests and expenditures for FY25. Notable expenditures include: Seed for habitat management that produced excellent stands of corn, Sudan sorghum, and millet at Coosawhatchie WMA (**Figure 4**) and Clemson Waterfowl Area (**Figure 5**); A storage container for Broad River Waterfowl Area (**Figure 6**); A tractor for management of moist soil impoundments on Santee Delta WMA (**Figure 7**); A small barge purchased for moving ATVs, Marshmasters, and materials for management of impoundments at Samworth WMA (**Figure 8**).

HABITAT ASSESSMENTS

Beginning in Fall 2023, habitat assessments were implemented to estimate the abundance and quality of food resources produced for waterfowl on Category 1 Waterfowl Areas. Standard, peer-reviewed methodologies were implemented on areas growing corn, rice, and moist soil plants to estimate waterfowl energy days (i.e. WEDs; A unit that measures how many waterfowl one acre of habitat can support for one day; Martin et al. 2023, Highway et al. 2024). By implementing these habitat assessments, SCDNR biologists and technicians can evaluate the effectiveness of wetland management activities and determine if properties are fulfilling the energetic demands of waterfowl wintering on SCDNR properties.

A new addition for Fall 2024, WED estimates were also generated for brackish and intermediate impounded marsh, green tree reservoirs, and planted millets and chufa. These habitat types or planted crops currently lack a standard field assessment for WED estimation. However, a literature review (Hagy et al. 2021) of peer-reviewed publications produced average values of energetic carrying capacity constants for the southeast region based on habitat quality categories of low, moderate, or high. These carrying capacity constants, combined with the field assessment estimates for corn, rice, and moist soil plants, allow staff to produce a total, minimum WED estimate for all Category 1 waterfowl areas.

In Fall 2024, habitat assessments were completed on 10 Category 1 Waterfowl Areas producing moist soil plants, corn, or rice. Additional WED estimates based on peer-reviewed publications of habitat carrying capacity constants were also calculated for 10 areas that produced brackish or intermediate marsh, agricultural millets or chufa, or had green tree reservoirs. Due to severe flooding impacts from Hurricane Helene, no estimate was produced from Santee Delta WMA. Estimates produced should be considered minimum WEDs as all habitat resource types on SCDNR waterfowl areas were not included in the total estimate produced in 2024.

Across all sites (17,176 acres evaluated), SCDNR properties supplied a minimum of 26,653,912 WEDs, averaging 1,552 WEDs per acre that was evaluated. This can be interpreted as one acre of wetland habitat can provide forage for 1,552 ducks for one day or can sustain one duck for 1,552 days. Across all areas that were evaluated, each site and habitat types produced varying levels of WEDs. A detailed report of WED estimates by property and habitat resource type can be found in Table 7.

WMA INFRASTRUCTURE UPDATES: JULY 1, 2024 - JUNE 30, 2025

CATEGORY 1 WATERFOWL AREAS

BEAR ISLAND WMA – 4,844 acres, 45 miles of dike, 110 water control structures

BEAVERDAM CREEK WATERFOWL AREA – 30 acres, 0.75 miles of dikes, 2 water control structures, 1 pump

BONNEAU FERRY WMA – 200 acres, 2 miles of dike, 10 water control structures, 1 pump

BROAD RIVER WATERFOWL AREA – 126 acres, 1.75 miles of dike, 7 water control structures, 2 pumps

CLEMSON WATERFOWL AREA – 20 acres, 0.4 miles of dikes, 1 water control structure, 2 pumps

COOSAWHATCHIE WMA – 101 acres, 3.9 miles of dike, 6 water control structures

DONNELLEY WMA – 2,118 acres, 8 miles of dike, 33 water control structures

SAMWORTH WMA – 968 acres, 16.6 miles of dikes, 24 water control structures (access by boat/barge only)

SANDY BEACH WATERFOWL AREA – 161 acres (including Stoney Bay), 2.2 miles of dike, 6 water control structures and one reversible pump

SANTEE COASTAL RESERVE WMA –

CEDAR ISLAND – 2,705 acres, 11.7 miles of dikes, 11 water control structures (access by boat/barge only)

MURPHY ISLAND – 5,580 acres, 15.6 miles of dikes, 14 water control structures (access by boat/barge only)

THE CAPE – 3,665 acres, 15.9 miles of dikes, 31 water control structures

SANTEE DELTA WMA (EAST & WEST) – 1,722 acres, 10 miles of dike, 13 water control structures

WATEREE RIVER (LOVE FARM) HP/WMA – 100 acres, 3.75 miles of dikes, 26 water control structures, 1 pump

SUMMARY OF CATEGORY 1 WATERFOWL AREA ACTIVITIES

- 507 miles of dike mowed
- 5.2 miles of dike re-topped with berm enhancement using long reach excavators
- 235 acres of soil disturbance (disking, rotovating, roller chopping) in impoundments
- 752 acres mowed in impoundments
- 1,794 acres burned in impoundments
- 2,668 acres sprayed with herbicide for noxious aquatic vegetation (i.e. white marsh, Phragmites, Cuban bulrush, etc.)
- 6 bulkheads were repaired/replaced
- 10 wooden trunks were repaired
- 7 water control structures were installed

MAJOR WEATHER EVENTS AND IMPACTS

TROPICAL STORM DEBBY

On August 8, 2024, Tropical Strom Debby produced record amounts of rainfall (up to 22 inches) in many locations across South Carolina. This torrential influx of water caused significant crop loss in many planted impoundments on Donnelley, Bonneau Ferry, and Broad River WMAs. Coastal Category 1 areas sustained flooding that overtopped impoundment dikes and caused isolated areas of erosion. No major infrastructure (i.e. dikes, water control structure) was damaged or habitat lost elsewhere across the state.

HURRICANE HELENE

On September 26, 2024, Hurricane Helene brought damaging winds and torrential rains across the southeast. Portions of Western North Carolina and the Upstate of South Carolina received rainfall in excess of 15 inches, with some areas receiving rainfall surpassing 22 inches. The remainder of the state also received rainfall from 2-8 inches locally. Fifty people were killed in South Carolina, and 1.3 million customers were without power. Substantial rainfall in the Upstate drained through the Broad and Saluda River Water Basins and into the Santee River Basin at Lake Marion. The maximum spillage from the Santee Cooper Dam from Lake Marion was 170,000 cubic feet per second—a record spillage event since construction of the dam was completed in 1942.

While the largest local rainfall and damaging wind events associated with Hurricane Helene occurred in upper or inland portions of the state, damage due to river flooding was experienced on Category 1 areas across the state:

SANTEE DELTA WMA: As a result of spillage of flood water from the Santee Cooper Dam, impoundments on Santee Delta East and West units were completely inundated by flood water from October 2-22, 2024. Despite the record discharge of floodwater, the only infrastructure damage occurred on the East side unit with one breach (**Figure 9**) and severe erosion in the parking lot. Both the breach and parking lot were repaired by SCDNR staff to ensure normal activities for duck season could continue (**Figure 10**). The dike system withstanding this hurricane event with minimal damage is a testament to the construction methods, equipment, and personnel expertise used during the Santee Delta renovation that occurred from 2022-2024. While the infrastructure experienced minimal damage, the extensive and prolonged flooding resulted in a complete loss of all moist soil foods on the Sante Delta WMA.

BROAD RIVER WATERFOWL AREA: This area experienced significant flooding with water exceeding depths of 5 feet over the top of impoundment dikes (**Figure 11**). All planted crops experienced significant failure and WEDs were severely reduced due to the extensive, prolonged flooding (See Habitat Assessments; **Table 7**; **Figure 11**). This area also suffered significant uprooting of hardwood trees in the Greentree Reservoir (**Figure 12**). Timber operations occurred in the Fall of 2025 to remove the downed trees and restore habitat openings in the GTR.

BEAVERDAM CREEK WATERFOWL AREA: Dikes were overtopped by flood water in numerous areas and trees were uprooted along the dikes. Two severely eroded

locations on the dike system were repaired, and trees were removed by SCDNR staff. The site experienced minimal crop loss in the impoundments due to the flooding. Planted millets and Sudan sorghum was able to withstand the flooded conditions and strong winds. Moist soil plants in the impoundments were able to persist and provide valuable winter forage (See Habitat Assessments; **Table 7**; **Figure 13**).

CLEMSON WATERFOWL AREA: Numerous trees were downed along the dikes, and a significant amount of sediment from Eighteen Mile Creek was pushed into the impoundment. This impoundment was flooded to a depth of 4-6 feet. Conditions allowed for rapid dewatering and mature crops experienced minimal loss due to flooding. Planted fields of corn, millets, and Sudan sorghum were able to withstand the flooded conditions (See Habitat Assessments; **Table 7**; **Figure 5**).

LOVE FARM WMA AND WATEREE RIVER HP WMA: All the planted crops in Cook's Mountain, Goodwill, and Brickyard impoundments were lost to extensive flooding (**Figure 14**). In Cook's Mountain, over half of the fence had to be rebuilt. Several large trees also caused extensive damage to fence on both the Love and Wateree WMA impoundments (**Figure 15**).

Other Category 1 areas across the state suffered minor dike erosion and experienced water levels in impoundments deeper than desired for prolonged periods of time.

COASTAL FLOOD EVENTS

In addition to the above-mentioned storms, Charleston Harbor recorded 59 King tides (tide of at least 6 feet, 6 inches above mean lower low water [MLLW]). On coastal Category 1 WMAs these high tide events cause erosion due to the over-topping of the dike systems. Under extreme and prolonged high tide conditions, additional water in the impoundments cannot be easily removed. This makes managing native vegetation and planted crops challenging and can also delay infrastructure repairs.

ADDITIONAL IMPROVEMENTS TO WATERFOWL AREAS

BEAR ISLAND AND DONNELLEY WMAS: A new Marsh Master amphibious buggy and associated implements were purchased to enhance wetland management activities.

BROAD RIVER WATERFOWL AREA: The dike between the DU pond and the Greentree Reservoir (GTR) was raised to minimize flooding of the GTR and the Old Impoundment during growing season rain events and to provide more consistent water level management during the winter.

CEDAR ISLAND, SANTEE COASTAL RESERVE: Specifications for a complete renovation of Cedar Island have been finalized and will be out for bid in Fall 2025.

COOSAWHATCHIE WMA: This waterfowl area has been incorporated into the CAT 1 lottery system and will be hunted in 2025.

DONNELLEY WMA: The Big Backwater, a wetland area part of the Category 2 hunt program, is a semi-permanently flooded wetland that is typically flooded for years at a time to promote desirable pad plant communities. This wetland area had become dominated by floating islands of vegetation, and non-native, invasive Cuban bulrush.

To promote control of Cuban bulrush and create more open water, Big Backwater was drained for 2025 growing season and a control burn was conducted in the wetland. Abundance of Cuban bulrush has since declined, and beneficials such as giant foxtail, yellow nutsedge, and smartweed have increased (**Figure 16**).

MURPHY ISLAND, SANTEE COASTAL RESERVE: Berm enhancement and dike re-topping are still ongoing on the Boggy section of Murphy Island. Miles of dike on the Boggy section were decimated by flooding associated with Hurricane Idalia (2023) and remaining damage was exacerbated by the 2024 Nor'easter. This work is being completed by SCDNR staff.

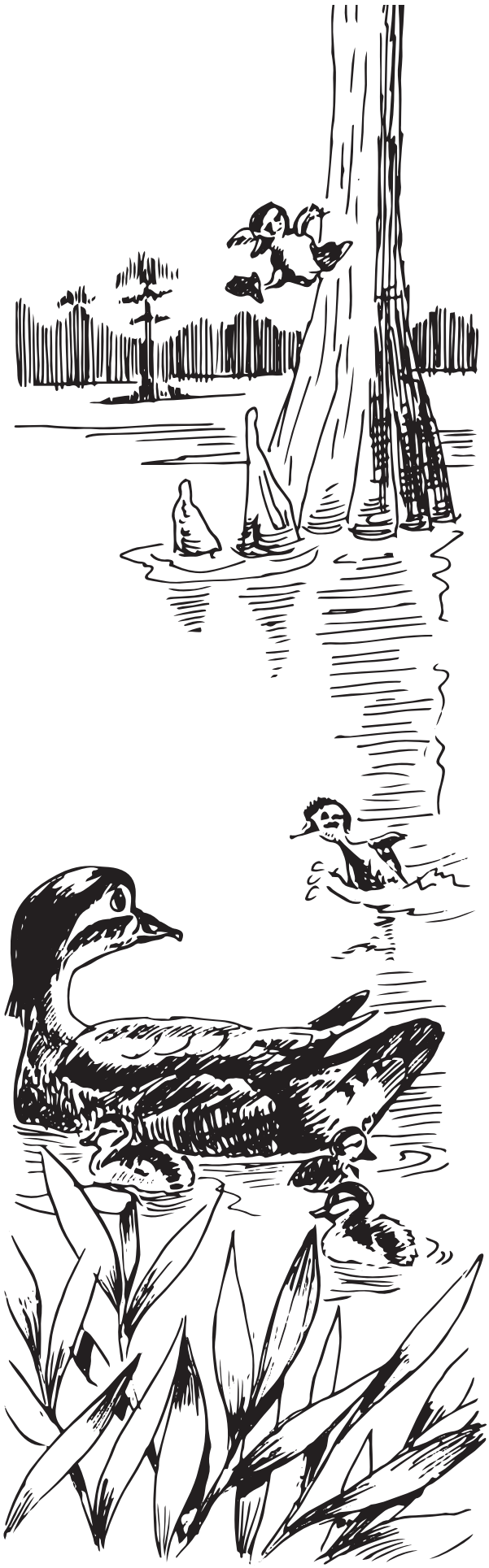
SANDY BEACH WMA: Stoney Bay is an 80-acre backwater of Lake Moultrie. The bay is open to public access from the lake for fishing from March to November. From November to March of each year, a water control structure is installed to restrict boat access and create waterfowl sanctuary. Due to an extended period of flooding, Stoney Bay has experienced a significant reduction in open water and has become dominated by floating mats of aquatic vegetation and woody plants (**Figure 17**). This reduces waterfowl use during the winter and limits access for fishermen. In spring 2025, permits and permissions were secured from the US Army Corps of Engineers and Santee Cooper to keep the water control structure in place to enable the draining of the bay for management purposes. A control burn was planned for summer 2025; however, high lake levels restricted the draining of the bay and prohibited introduction of fire.

SANTEE DELTA WMA: A new tractor and associated implements were purchased for wetland management (**Figure 7**).

WATERFOWL MANAGEMENT AREA PEER REVIEWS

In 2021, SCDNR leadership developed and implemented the Waterfowl Management Area Peer Review Program as a proactive measure to critically evaluate all aspects of management on Category 1 Waterfowl Areas. Each evaluation is completed by a panel of nationally recognized wetland management experts. During the review process, these professionals are tasked with assessing and evaluating habitat management, infrastructure needs, and hunt management on a specific Category 1 area. Over a series of years, evaluations will be completed on all Category 1 areas. In fall 2025, a review panel will evaluate three Piedmont Waterfowl Areas: Beaverdam Creek, Broad River, and Clemson.

To date, final reports have been produced for Samworth WMA (2022), Bear Island WMA (2023), Wateree HP WMA & Love Farm WMA (2024), and Santee Coastal Reserve WMA (2024). Completed Waterfowl Management Area Peer Review reports can be found at: https://www.dnr.sc.gov/hunting/waterfowl.html.



WOOD DUCK BOX PROGRAM

The wood duck is one of the most important species to South Carolina waterfowl enthusiasts and is the only duck we can effectively manage production habitat for throughout all geographic regions of the state. The Wood Duck Box Program was implemented in 1982 to increase wood duck production by providing artificial nest boxes to supplement natural cavities of forested wetlands. Since 1982, with funding support from the State Migratory Waterfowl Permit, the program has distributed a total 46,984 nest boxes for private landowners to install and maintain in wetlands across the state. This program is arguably one of the agency's most popular outreach programs to date.

In the fall of each year, using the Go Outdoors SC app, private landowners can apply for up to three wood duck nest boxes. Individuals are selected through a lottery and receive both box(es) and predator guard(s) that are distributed from select SCDNR offices in December and January of each year.

Beginning with 2023-2024 distribution of nest boxes from the Wood Duck Box Program, a metal tag with a QR code was affixed to the face of each nest box. This QR code directs landowners to a Wood Duck Box Managers data form to voluntarily report information on nesting activity from the boxes they maintain (i.e. box used by wood ducks, number of eggs laid, and number of eggs hatched; **Figure 18**). The information that private landowners submit allows the Agency to index active management of wood duck boxes sourced from the SCDNR Wood Duck Box Program and may allow for annual estimates of box use and duckling production.

During the 2024 wood duck nesting season (January-September), only 49 reports were submitted. For the upcoming 2026 wood duck breeding season, waterfowl program staff will increase public communication to promote box maintenance and use of the Wood Duck Box Manager data form.

In early winter 2025-2026, we anticipate distribution of 1,200 new nest boxes and predator guards. Additional metal tags with QR codes will also be available to landowners desiring to add those to existing boxes.

EDUCATION, OUTREACH & SERVICE

WATERFOWL BANDING WORKSHOP

Each year, SCDNR partners with the USFWS to capture and band waterfowl for monitoring waterfowl populations, survival and harvest rates. These monitoring efforts are critical tools for establishing annual waterfowl seasons and bag limits. In South Carolina from July through September, staff are busy capturing and banding wood ducks, mottled ducks, and black-bellied whistling ducks. To ensure we maintain high data quality standards and safety protocols, the Waterfowl Program hosted a continuing education workshop for all agency staff involved with waterfowl banding operations and data management in July 2024. Workshop topics included: Banding ethics, safety procedures, and speciating, aging and sexing of waterfowl. Staff also participated in a hands-on field demonstration for over-water and land deployments of rocket nets. “Tips, Tricks, and Lessons Learned from the Field” were also exchanged among staff.

WATERFOWL BANDING TEAM ACKNOWLEDGEMENTS

From late nights on the airboat searching wetlands for wood ducks and mottled ducks, to coordinating with landowners, monitoring of bait sites, equipment set up, long hours sitting in hot ground-blinds waiting for just the right time to fire a rocket net, early mornings to set and check traps, disinfecting and cleaning equipment, and finally data entry—Waterfowl banding is no small job. Each summer, SCDNR staff invest hundreds of hours striving to meet banding quotas for wood ducks, mottled ducks, and black-bellied whistling ducks. In July 2024, Chief Billy Dukes and Biologist Molly Kneece recognized two banding teams for their banding achievements and contributions to the agency waterfowl banding program. Across the state, staff have banded 2,609 ducks during the 2021-2023 summer banding seasons. During this period the Airboat Banding Team of Sam Chappelear, Tom Harkins, Jason Deavers, Kassie Cannington, Welsey Wells, Cameron Felkel, Zadok Moss, and Alicia Farrell captured and banded 1,375 ducks on state owned and private land sites. Leading the way for rocket net and trap captures, the Banding Team of Travis Bennett, Hunter Young, Cameron Foster, Corey Baldwin, Gene Price, and Thomas Kiker captured 343 wood ducks on state, federal, and private land sites. Each team was awarded a hand-carved wood duck decoy to proudly display in their field offices.

Once the banding season concludes each year, data sheets and remaining bands are submitted from the field. Hours are invested to ensure banding data is entered and submitted to the US Geological Survey (USGS) Bird Banding Laboratory and to ensure that all bands are accounted for. This is a tedious job that requires an eye for detail. Karen Rourk was also recognized for 12 years of managing band inventory and entry of waterfowl banding data. This is a voluntary role that Karen has taken on in addition to her normal duties serving as Administrative Assistant and Coastal Nuisance Wildlife Coordinator.

US FISH & WILDLIFE SERVICE WINGBEE

Every year a sample group of waterfowl hunters from across the nation is asked to participate in the USFWS Parts Collection Survey (PCS). In this survey, selected hunters are asked to collect a wing from each duck and specified feathers from each goose they harvest during the season. Parts are submitted to the USFWS in pre-paid envelopes and stored in freezers until the conclusion of the season. Each year approximately 20,000 duck wings and goose

parts are submitted to USFWS from the Atlantic Flyway alone. Over the course of a week, USFWS, State Biologists, and Technicians sort and examine each part submitted to determine the species, age, and sex composition of the annual waterfowl harvest. This information is critical for harvest management decision of subsequent waterfowl seasons.

Since 2023, SCDNR has sent biologists and technicians to participate in the Atlantic Flyway Wingbee at the Patuxent National Wildlife Research Refuge in Laurel, Maryland. At the event, staff gain valuable experience learning determine species, age and sex of multiple species of waterfowl only using duck wings, and goose wingtips and tail feathers (**Figure 19**). Staff then bring these skills back to SC and can help others sharpen their skills, ensuring data quality in aging and sexing of ducks for the state waterfowl banding program. The Waterfowl Program would like to thank the following SCDNR staff for their contributions to the USFWS Parts Collection Survey Wingbee: Joseph Woods (2023, 2024,2025), Zoey Thomas (2024, 2025), Caroline Guerry (2024, 2025), Jason Deavers (2025), Ashleigh Benton (2023), Matt Smith (2023), and Jake Merendino (2023)

STAFF HIGHLIGHT

EMILY COPE

DEPUTY DIRECTOR, WILDLIFE AND FRESHWATER FISHERIES (RETIRED)

After graduating from Clemson University with a B.S. and a M.S. in Aquaculture, Fisheries, and Wildlife Biology, Emily Cope began her career with the South Carolina Department of Natural Resources in January 1999 as the Forest Stewardship Program Supervisor. She later became the Assistant Regional Wildlife Biologist and was soon promoted to be the Habitat Protection Coordinator for the Agency where she was instrumental in protecting large significant properties, many of which are currently in the Wildlife Management Area program. Emily's dedication to the Agency and its mission landed her in the role of Assistant to the Director for more than six years. This position prepared her for her role as the Wildlife and Freshwater Fisheries (WFF) Deputy Director, a position she held for more than thirteen years. Emily retired from the SCDNR while in this position in May 2025.

While Emily made significant contributions to all aspects of the Agency in each of her leadership roles, her tenure as WFF Deputy Director made a positive everlasting mark on the state's natural resources. Her desire and tenacity were paramount in the huge strides taken on improving waterfowl areas across the state. Significant time and resources were spent making the argument on the importance and need for funding much needed renovations of the state's waterfowl areas, especially the highly sought after Category 1 waterfowl areas. Over a long period of time, budget constraints, numerous hurricanes, King Tides, lack of staff and heavy equipment had taken its toll on many of the Category 1 waterfowl areas. Staff had been "band-aiding" damage to the best of their ability to maintain the integrity of the waterfowl impoundments. However, it was time for significant renovations to occur to keep them in the productive mode that attracts thousands of ducks to the state that hunters so desire. Emily worked tirelessly with fellow SCDNR Directors, the General Assembly, and partners such as Ducks Unlimited to obtain funding for match for several NAWCA and Coastal Wetland Grants that allowed these expensive large-scale projects to finally occur. All of this was done while weathering considerable unwarranted criticism from ill-advised constituents on how they thought waterfowl management should occur. Time, funding, patience and a dedicated hard-working field staff brought this to fruition and this work continues today after her retirement.

Major highlights include:

- Significant, total renovations on Samworth WMA (Rabbit Island, Upper Middleton, Upper Middleton Cut, Lower Middleton, Lower Middleton Cut) - $4,000,000. This does not include significant work done in-house by DNR staff on Pullfare, Mill Pond, Carr Complex, and Back Field impoundments.
- Total renovation of both Santee Delta East and West - $2,600,000
- Renovations to portions of the Cape, Santee Coastal Reserve - $1,400,000

- Renovation of the Boggy Unit on Murphy Island, Santee Coastal Reserve - $1,300,000
- Bonneau Ferry WMA waterfowl area improvements - $274,000
- Broad River waterfowl improvements - $340,000
- Clemson Waterfowl Area improvements - $44,275
- Beaverdam Waterfowl Area improvements - $418,129
- Updated and enlarged boat ramp and new floating dock at Samworth boat landing - $133,100
- Replaced damaged dock and enlarged boat ramp at Santee Coastal Reserve - $349,000
- Phragmites control - $2,000,000
- Currently ongoing is a long overdue total renovation of Cedar Island, Santee Coastal Reserve -estimated cost over $4,000,000
- Her leadership allowed us to recover from significant costly disasters such as the record Flood of 2015; Hurricanes/Tropical storms Matthew, Irma, Irene, Florence, Michael, Dorian, Isaias, Ian, Nicole, Idalia, Debby, and Helene. All storms caused damage, some of which was extremely significant to numerous waterfowl areas. Minimum cost of repairs was $2,100,000 (not included is work done in house).
- Staff now has at its disposal – 4 Marsh Masters w/ implements, multiple barges and pusher boats, 5 tracked trackhoes, 3 amphibious trackhoes, mini-excavators, tractors, and airboats.
- Increased the staff size in some areas.
- Increased operations budgets on waterfowl areas to allow for more in-house work to be conducted rather than contracting.
- Largest application rate in the history of the lottery waterfowl hunts indicates quality hunts that are in high demand are a result of this endeavor.

Emily Cope has been the backbone who has made all the above accomplishments a reality. Her tenacity, positive attitude and desire to conquer motivated and inspired staff at all levels, from the senior staff down to the field staff and everyone in between. Her attitude makes you want to succeed, and staff have risen to the occasion. Waterfowl and waterfowl hunters will benefit for generations to come due to her efforts.

TABLES

TABLE 1. SCDNR lottery waterfowl hunt participation by WMA, 2024-25.

WMA	# of Hunts Scheduled	# Hunts Cancelled	# of Hunts Conducted	# Hunters Selected by Lottery	Hunter Opportunity Lost Due to Cancelled Hunts	# Hunters Possible after Cancellations	# Hunters that Participated	% Participation
Bear Island	18		18	353		353	302	86%
Beaverdam	7	1	6	49	8	41	29	71%
Broad River	7	1	6	46	6	40	34	85%
Clemson	7	1	6	32	5	27	23	85%
Donnelley	7		7	33		33	28	85%
Samworth	3		3	17		17	14	82%
Sandy Beach	6	1	5	20	3	17	17	100%
Santee Delta - East	8		8	61		61	43	70%
Santee Delta - West	8		8	48		48	39	81%
SCR - Cape	9		9	144		144	133	92%
SCR - Cedar	9	1	8	108	12	96	92	96%
SCR - Murphy	9	1	8	160	17	143	137	96%
Wateree	9		9	33		33	25	76%
ALL SITES	**107**	**6**	**101**	**1104**	**51**	**1053**	**916**	**87%**

TABLE 2. SCDNR lottery waterfowl hunt participation for Clemson and Donnelley WMAs, 2024-25. Clemson and Donnelley have been used as youth lottery waterfowl hunt sites since the 1995-96 and 1992-23 seasons, respectively. Beginning with the 2024-25 waterfowl season both sites became part of the general, Category 1 waterfowl lottery hunt in effort to increase public use of those sites. Hunter participation from 2021-2024 youth lottery seasons are compared to the general waterfowl lottery participation in 2024-25.

WMA	% Participation					% Change in Hunter Participation in 24-25, Compared to Avg. Youth Participation
	YOUTH 21-22	YOUTH 22-23	YOUTH 23-24	YOUTH AVERAGE	ADULT 24-25	
Clemson	53%	84%	52%	63%	85%	+35%
Donnelley	82%	82%	67%	77%	85%	+10%

TABLE 3. SCDNR Category 1 Waterfowl Lottery Hunt harvest statistics, 2024-25

2024-2025 SPECIES	BEAR ISLAND	BEAVERDAM	BROAD RIVER	CLEMSON	DONNELLY	SAMWORTH	SANDY BEACH	SANTEE DELTA - EAST	SANTEE DELTA - WEST	SANTEE DELTA TOTAL	SCR THE CAPE	SCR CEDAR ISL	SCR MURPHY	SCR TOTAL	WATEREE	CATEGORY 1 TOTAL
Mallard	14	2	7	1	1		7	5	5	10	5	1	3	9		51
Dom/Rel Mallard												1		1	2	3
Black Duck	9		1						1	1	1	3	14	18		29
Mallard x Black	2	1									2		1	3		6
Mottled Duck	66				4			3		3	25	18	30	73		146
Gadwall	65		9				6				108	14	127	249		329
American Wigeon	13						1				31	2	78	111		125
Green-winged Teal	149	8	36	3	11	5	10	32	10	42	87	158	135	380	4	648
Blue-winged Teal	139				10	3	3	23	17	40	57	20	10	87		282
Northern Shoveler	68			2						0	82	54	69	205	1	276
Northern Pintail	6		1		1						73	26	82	181		189
Wood Duck	34	17	5	11	28	15	32	1	11	12					20	174
Redhead	2															2
Canvasback																
Scaup	15										9	2	2	13		28
Ring-necked Duck	2		13		3	3					12			12	13	46
Golden-eye																
Bufflehead	8										5	3	7	15		23
Ruddy Duck	11										6	4	8	18		29
Tree ducks																
Sea ducks																
Canada Goose			1													1
Snow Goose													5	5		5
Coot	13				2			2		2	1	2	8	11		28
Mergansers	61		2	4	4			2	3	5	4	15	3	22	3	101
TOTAL HARVEST	**677**	**28**	**75**	**21**	**64**	**26**	**59**	**68**	**47**	**115**	**508**	**323**	**582**	**1413**	**43**	**2521**
# HUNTERS	**302**	**29**	**34**	**23**	**28**	**14**	**17**	**43**	**39**	**82**	**133**	**92**	**137**	**362**	**25**	**916**
DUCKS/HUNTER	**2.2**	**1.0**	**2.2**	**0.9**	**2.3**	**1.9**	**3.5**	**1.6**	**1.2**	**1.4**	**3.8**	**3.5**	**4.2**	**3.9**	**1.7**	**2.8**
SHOTS FIRED	**3805**	**243**	**508**	**214**	**379**	**148**	**279**	**406**	**310**	**716**	**2293**	**1492**	**2612**	**6397**	**373**	**13062**

TABLE 4. *SCDNR Youth site, Category 1 Waterfowl Lottery Hunt harvest statistics, 2024-25.*

2023-2024 YOUTH SPECIES	BEAR ISLAND	BEAVERDAM	BONNEAU FERRY	BROAD RIVER	DONNELLY	SANDY BEACH	SCR - MURPHY	SCR - CAPE	SCR TOTAL	WATEREE	YOUTH TOTAL
Mallard				2			1		1		3
Dom/Rel Mallard		1									1
Black Duck				2							2
Mallard x Black											
Mottled Duck	2						2	1	3		5
Gadwall	7		0	2			10	4	14		23
American Wigeon				1		1	4	2	6		8
Green-winged Teal	7		11	2		1	7	3	10		31
Blue-winged Teal	2		1		2						5
Northern Shoveler	4						8	3	11		15
Northern Pintail							4	2	6		6
Wood Duck	1		33	1		3				1	39
Redhead											
Canvasback											
Scaup	1						1	2	3		4
Ring-necked Duck			45	1							46
Golden-eye											
Bufflehead								1	1		1
Ruddy Duck							1		1		1
Tree ducks											
Sea ducks											
Canada Goose											
Snow Goose											
Coot	1										1
Mergansers	1		3		1						5
ONLY FEB. HUNT	**x**	**x**		**x**	**x**	**x**	**x**	**x**	**x**	**x**	
TOTAL HARVEST	**26**	**1**	**93**	**11**	**3**	**5**	**38**	**18**	**56**	**1**	**196**
# HUNTERS	**8**	**1**	**33**	**3**	**3**	**1**	**9**	**7**	**16**	**2**	**67**
DUCKS/HUNTER	**3.3**	**1.0**	**2.8**	**3.7**	**1.0**	**5.0**	**4.2**	**2.6**	**3.5**	**0.5**	**2.9**
SHOTS FIRED	**116**	**10**	**621**	**52**	**25**	**21**	**170**	**113**	**283**	**25**	**1153**

TABLE 5. Abundance of waterfowl by WMA and guild estimated during aerial surveys, January 28-30, 2025.

WMA	DABBLING DUCKS	DIVING DUCKS	GEESE	SWANS	CRANES	TOTAL WATERFOWL
Yawkey	9,186	1,896	0	0	0	11,083
Samworth	128	1	0	0	0	129
Santee Coastal	18,612	2,017	0	0	0	20,629
Santee Delta	109	0	0	0	0	109
Sandy Beach	301	2	0	0	0	303
Bear Island	2,530	106	0	0	0	2,636
TOTAL	**30,866**	**4,022**	**0**	**0**	**0**	**34,889**

TABLE 6. A summary of FY24 Waterfowl Permit (Duck Stamp) requests and expenditures.

DESCRIPTION OF REQUEST	BUDGET	EXPENDED	% EXPENDED
Statewide Wood Duck Box Project	$100,000	$66,287	66%
Wood Duck Nest Box Recruitment Project, year 6	$10,000	$6,969	70%
Midwinter Aerial Surveys	$12,000	$6,287	52%
Migration Ecology and Demographics of E. Mallards (year 4 of 4)	$2,500	$0	0%
Control of Undesirable Vegetation	$40,000	$8,199	20%
Atlantic Flyway Council Banding Assessment and Dues	$11,500	$11,670	101%
Habitat Management: Plantings, Maintenance, and Equipment	$676,350	$496,422	73%
AFWA Fall Flights Program (Contribution to DU Canada)	$61,284	$61,284	100%
SUMMARY FY25	**$913,634**	**$657,115**	**72%**

TABLE 7. A summary of Waterfowl Energy Day (WED) production by site and habitat resource type, Fall 2024. This table continues on page 31.

Site	Total Acres	Rapid Habitat Assessments									
		Ac. Moist Soil	Avg. Seed lbs/ac	Total Moist Soil WEDs	Ac. Corn	% Failure	Median bu/ac	Total Corn WEDs	Ac. Rice	Median bu/ac	Total Rice WEDs
Bear Island	4,555	681	213	450,564	3	40	60	10,085	38	75	406,904
Beaverdam Creek	34	26	217	21,346							
Bonneau Ferry	41				9	10	161	366,628			
Broad River	27	16	279	16,097	11	45	70	79,346			
Clemson	22				4	0	75	89,799			
Donnelly	565	164	19	9,705							
Love Farm	10				7	100	0	0			
Ramsey Grove	83				30	100	0	0	28	144	897,628
Samworth	562	562	200	396,121							
Sandy Beach	55										
SCR	11,160										
Santee Delta	1,448	*Helene									
Wateree River	62	48	142	25,589	12	10	0	0			
TOTAL	**17,176**	**1,497**	**-**	**919,422**	**76**	**-**	**-**	**545,858**	**66**	**-**	**1,304,532**

MOIST SOIL Average moist-soil seed production in the MAV is **590 (lbs/ac)** and **2,202 (WED/ac)** (Hagy [2021], Kross et al. [2008]). Waterfowl Energy Days/Acre (WED/ac)-claculated using the true metabolizable energy of moist-soil seeds and daily energy requirements of waterfowl (300 kcal/g) following Martin et al. (2022) & Howard et al. (2023).

CORN Average unharvested corn yields on NWRs in the MAV are 102 (bu/ac), 5,703 (lbs/ac) and 31,645 (WED/ac). Waterfowl Energy Days (WED) are a generic measure of daily energy requirements of waterfowl (300 kcals/day; approximate DER of a mallard during winter) calculated using the true metabolizable energy of corn (3.76 kcal/gram) following Highway et al. (2023) assuming 56 lb/bu.

RICE Average rice yields on NWRs in the MAV are 126 (bu/ac), 5,661 (lbs/ac), and 28,587 (WED/ac). Grain yield is estimated in biomass (bu/ac, lbs/ac) and energy assuming 45 lb/bu. Waterfowl Energy Days (WED) are calculated using the true metabolizable energy of rice (3.34 kcal/g) from published sources (e.g. Kaminski et al. 2003) and a generalized measure of the daily energy requirements of waterfowl (300 kcal/g; approximate DER of a mallard during winter) following Howard et al. (2023).

TABLE 7. Continued.

Site	Ac. Millet	Avg. Millet WEDs/ac (moderate quality)*	Total Planted Millet WEDs	Ac. Other	Avg. Other WEDs/ac (moderate quality)*	Total Other WEDs	Ac. Brackish	Avg. Brackish WEDs/ ac (mod. quality aquatic bed)*	Total Brackish WEDs	Ac. Intermed.	Avg. Intermed. WEDs/ ac (mod. quality)*	Total Intermed. WEDs	Total WEDs by Site
Bear Island							2,226	1,600	3,561,600	1,607	700	1,124,900	**5,554,053**
Beaverdam Creek	8	5,000	40,000										**61,346**
Bonneau Ferry	32	5,000	160,000										**526,628**
Broad River													**95,443**
Clemson	18	5,000	90,000										**179,799**
Donnelly	*Helene						401	1,600	641,600				**651,305**
Love Farm				3	2,000	6,000							**6,000**
Ramsey Grove	25	5,000	125,000										**1,022,628**
Samworth													**396,121**
Sandy Beach	55	5,000	275,000										**275,000**
SCR							11,160	1,600	17,856,000				**17,856,000**
Santee Delta	*Helene												****
Wateree River				2	2,000	4,000							**29,589**
TOTAL	**138**	-	**690,000**	**5**	-	**10,000**	**13,787**	-	**22,059,200**	**1,607**	-	**1,124,900**	**26,653,912**

*Values taken from HRT table (Hagy 2021)

FIGURES

FIGURE 1. Movements of 20 hen mallards outfitted with GPS transmitters in SC during February 2022, 2023, & 2025. Tracks represent movements from February 2022-June 2025.

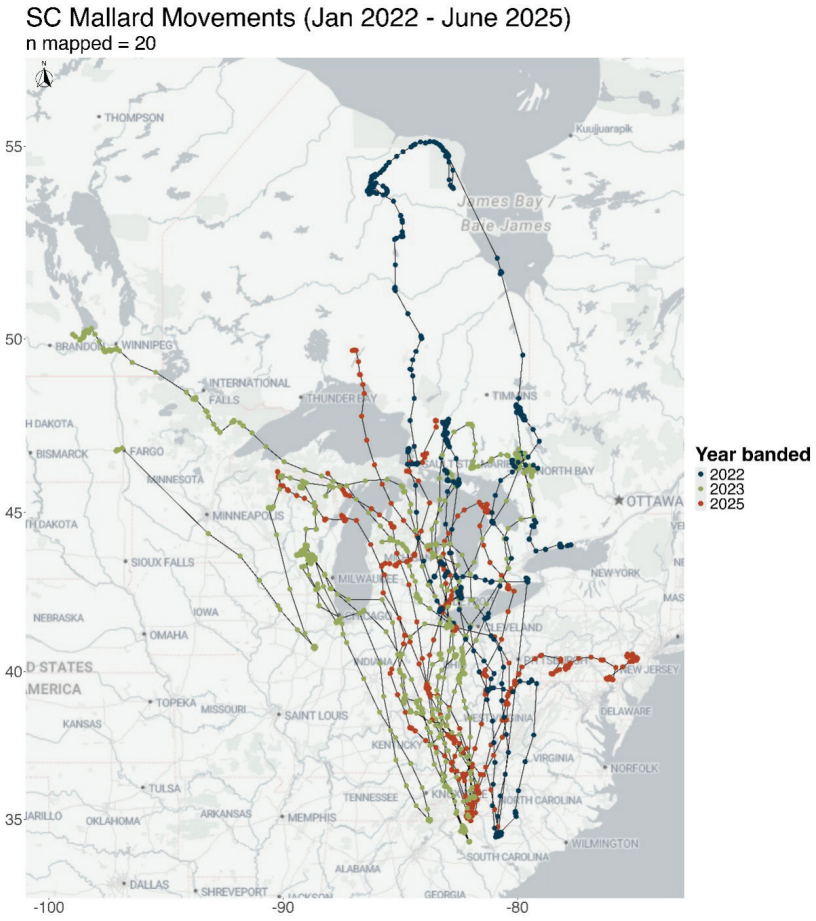


FIGURE 2. Long term ducks per hunter harvest average, under a six-bird bag limit on all SCDNR Category 1 Lottery Hunt Properties, 1998-2025.

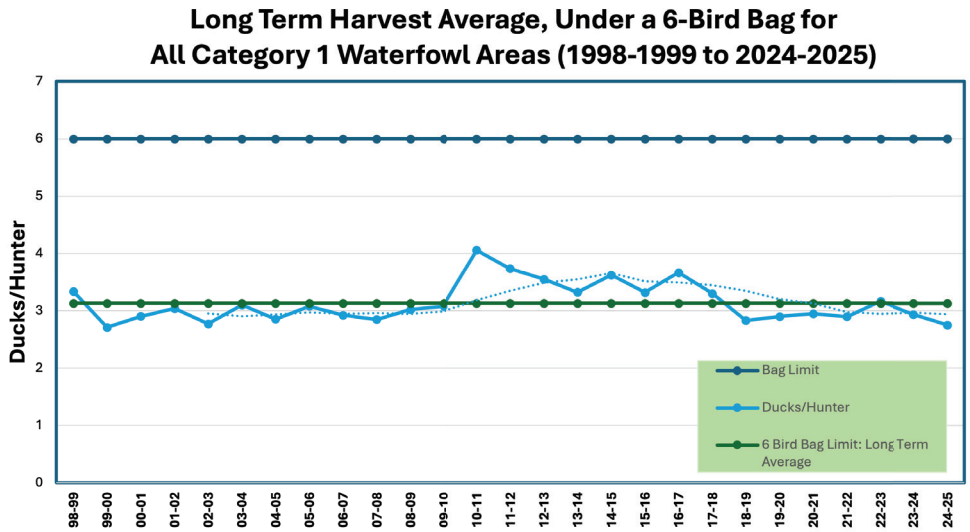
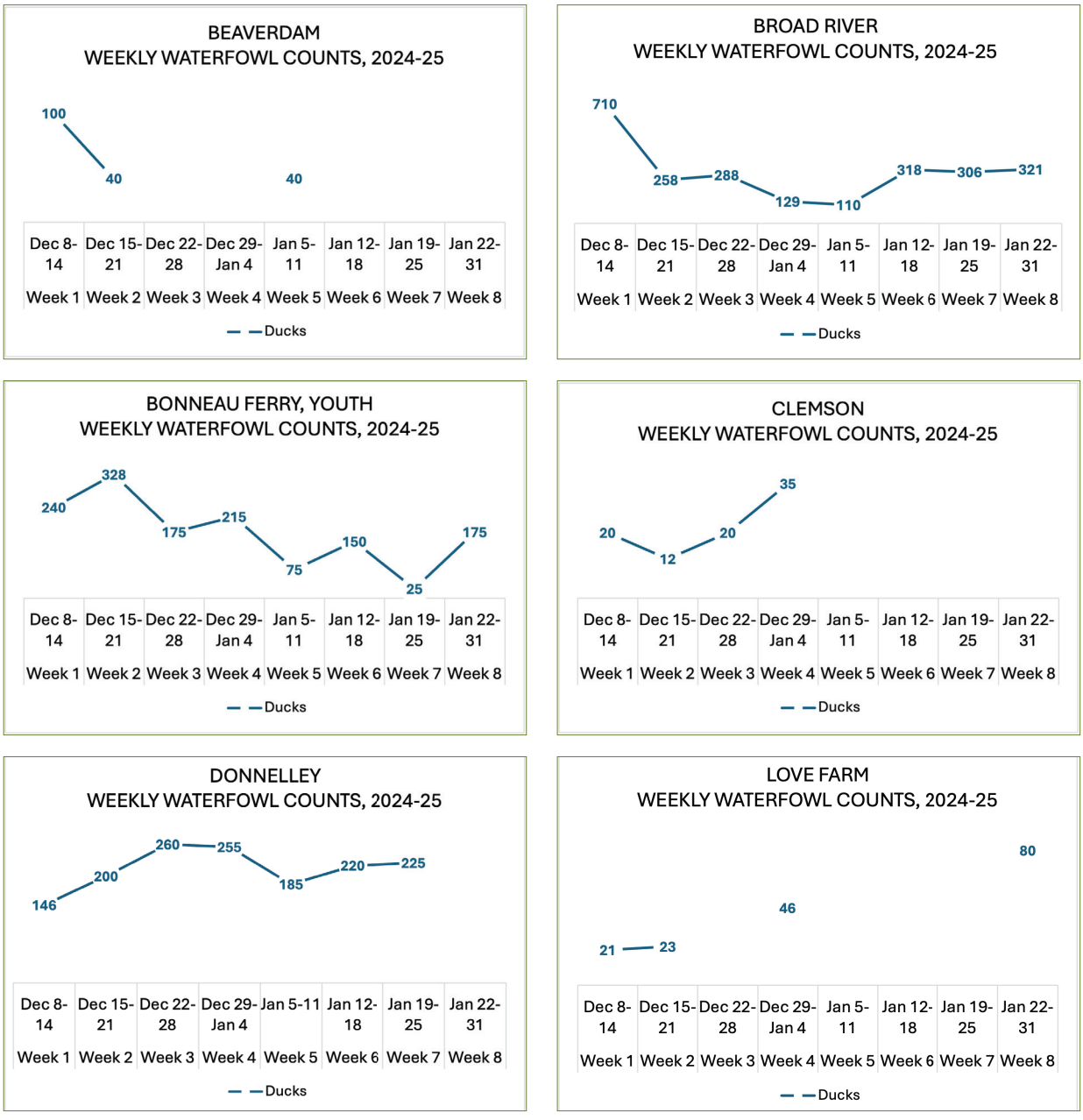
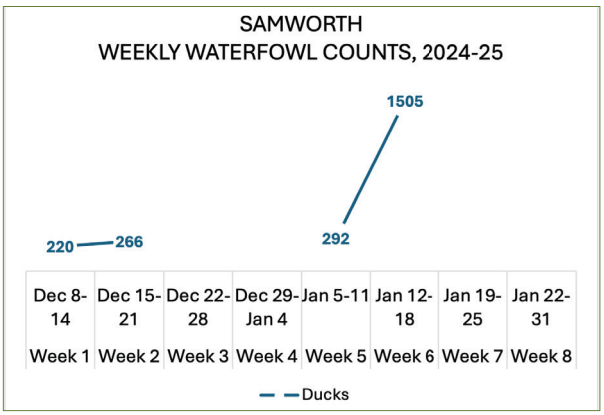
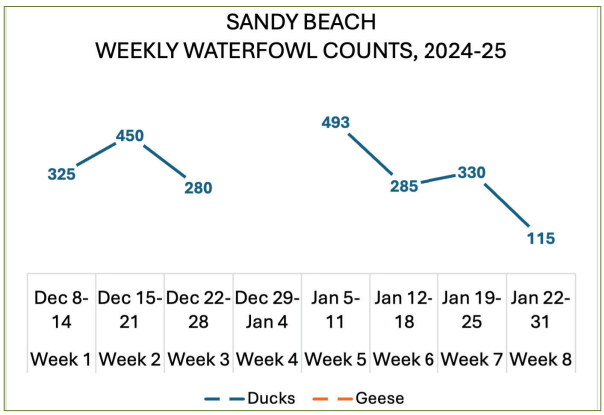
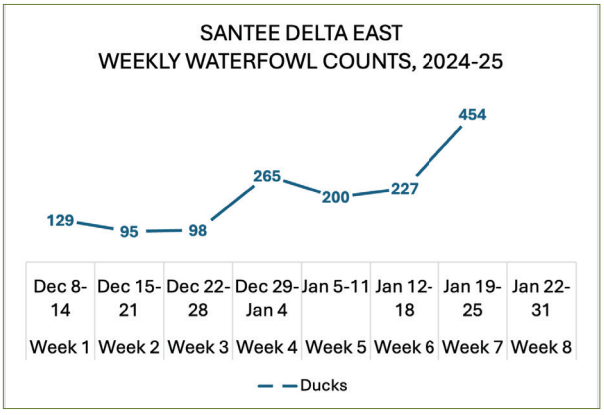


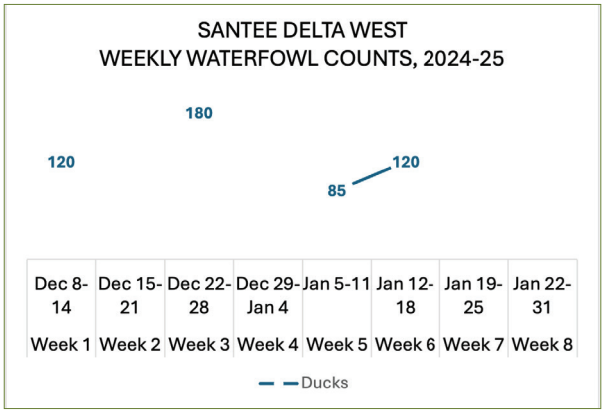
FIGURE 3. Weekly waterfowl abundance obtained from ground counts on 11 SCDNR Waterfowl Areas, 2024-25. Count data is considered the minimum abundance for all waterfowl areas as staff avoided flushing birds for the purpose of a complete count to reduce disturbance on all sites.




SAMWORTH
WEEKLY WATERFOWL COUNTS, 2024-25
220
266
292
1505
Dec 8-14
Dec 15-21
Dec 22-28
Dec 29-Jan 4
Jan 5-11
Jan 12-18
Jan 19-25
Jan 22-31
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Ducks


SANDY BEACH
WEEKLY WATERFOWL COUNTS, 2024-25
325
450
280
493
285
330
115
Dec 8-14
Dec 15-21
Dec 22-28
Dec 29-Jan 4
Jan 5-11
Jan 12-18
Jan 19-25
Jan 22-31
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Ducks
Geese


SANTEE DELTA EAST
WEEKLY WATERFOWL COUNTS, 2024-25
129
95
98
265
200
227
454
Dec 8-14
Dec 15-21
Dec 22-28
Dec 29-Jan 4
Jan 5-11
Jan 12-18
Jan 19-25
Jan 22-31
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Ducks


SANTEE DELTA WEST
WEEKLY WATERFOWL COUNTS, 2024-25
120
180
85
120
Dec 8-14
Dec 15-21
Dec 22-28
Dec 29-Jan 4
Jan 5-11
Jan 12-18
Jan 19-25
Jan 22-31
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Ducks

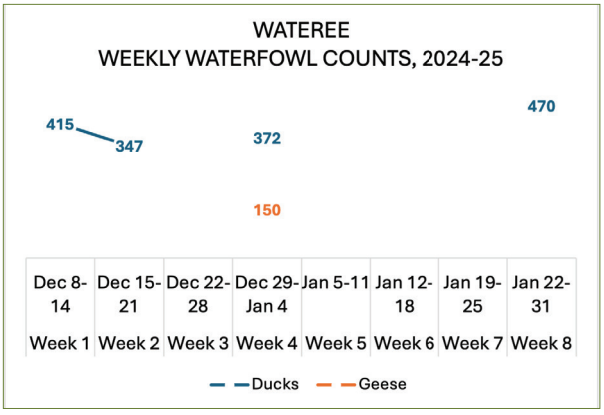

WATEREE
WEEKLY WATERFOWL COUNTS, 2024-25
415
347
372
150
470
Dec 8-14
Dec 15-21
Dec 22-28
Dec 29-Jan 4
Jan 5-11
Jan 12-18
Jan 19-25
Jan 22-31
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Ducks
Geese

FIGURE 4. *Seed purchased with SC Duck Stamp Funds produced a successful crop of rice in the newly acquired Coosawhatchie WMA waterfowl impoundments, October 2024.*

FIGURE 5. *Seed purchased with SC Duck Stamp Funds produced successful crops of millet, Sudan sorghum, and corn for waterfowl lottery hunts at Clemson Waterfowl Area, October 2024.*

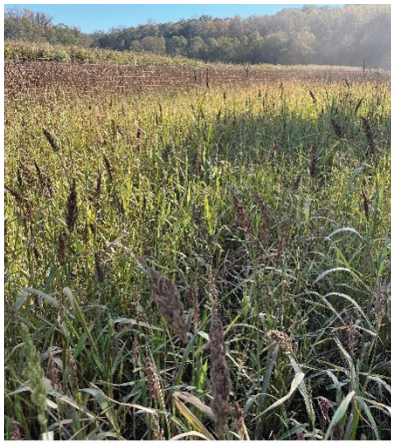


FIGURE 6. *A storage container purchased with SC Duck Stamp Funds was installed at Broad River Waterfowl Area, Fall 2024.*

FIGURE 7. *A new tractor was purchased with SC Duck Stamp Funds to implement and increase the efficiency of management for moist soil plants at Santee Delta WMA, Spring 2025.*

FIGURE 8. *A small barge for moving equipment at Samworth WMA was purchased with SC Duck Stamp Funds, Spring 2025.*

FIGURE 9. *A perimeter dike breach on Santee Delta East WMA. This damage occurred from extensive flooding associated with Hurricane Helene, October 2025. The breach was repaired by SCDNR staff prior to the beginning of waterfowl season, 2024-2025.*

FIGURE 10. *Severe erosion to the parking lot of Santee Delta East. This damage occurred from extensive flooding associated with Hurricane Helene, October 2025. The parking lot was repaired by SCDNR staff prior to the beginning of waterfowl season, 2024-2025.*

FIGURE 11. *Broad River Waterfowl Area experienced significant flooding following Hurricane Helene in October 2024. A) Water exceeded depths of 5 feet over the top of impoundment dikes which is visible from the muddy watermark on perimeter vegetation. B) Planted agricultural crops also experienced significant damage. Approximately 45% of the corn crop was lost due to damaging winds and prolonged flooding.*

A.

B.

FIGURE 12. *Broad River Waterfowl Area suffered significant uprooting of hardwood trees in the Greentree Reservoir due to high winds and abundant rainfall associated with Hurricane Helene, October 2024.*

FIGURE 13. *Beaverdam Creek Waterfowl Area moist soil areas produced an abundant crop of smartweed in Fall 2024 and was able to sustain flooding associated with Hurricane Helene. This site provided valuable forage for the 2024-2025 waterfowl season.*

FIGURE 14. *Wateree River HP WMA experienced extensive flooding associated with Hurricane Helene, October 2024. A) High water conditions limited access to impoundments. B) All impoundments were completely inundated with flood water. Pictured Goodwill Impoundment.*

A.

B.

FIGURE 15. *Wateree River HP WMA experienced extensive flooding associated with Hurricane Helene, October 2024. The property had considerable damage to all fences surrounding the waterfowl impoundments. More than half of the fence in the Cook's Mountain impoundment had to be repaired.*

FIGURE 16. *The Big Backwater at Donnelley WMA is a wetland area part of the Category 2 hunt program. This semi-permanently flooded wetland is typically flooded for years at a time to promote desirable pad plant communities. A) March 2025: This wetland area had become dominated by floating islands of vegetation, and non-native, invasive Cuban bulrush. B) April 2025: To promote control of Cuban bulrush and create more open water, Big Backwater was drained for 2025 growing season and a controlled burn was conducted in the wetland. C) June 2025: Abundance of Cuban bulrush has since declined, and beneficials such as giant foxtail, yellow nutsedge, and smartweed have increased. The star on each image represents a common reference point between photos.*

A.

B.

C.

FIGURE 17. *Stoney Bay is an 80-acre backwater of Lake Moultrie and part of Sandy Beach WMA. Due to an extended period of flooding, Stoney Bay has experienced a significant reduction in open water and has become dominated by floating mats of aquatic vegetation and woody plants. After securing permits, staff attempted to drain the bay to conduct a controlled burn during spring-summer 2025. However, high lake levels prevented adequate drainage of the bay for management purposes. Photo from October 2024.*

FIGURE 18. *Beginning with 2023-2024 distribution of nest boxes from the Wood Duck Box Program, a metal tag with a QR code was affixed to the face of each nest box. This code directs landowners to a data form that allows them to submit information on box use (i.e. box used by wood ducks, number of eggs laid, and number of eggs hatched). This provides an easy way for private landowners to voluntarily report nesting activity from boxes they maintain.*

FIGURE 19. *SCDNR staff Joseph Woods and Zoey Thomas determine the species, age, and sex of duck wings at the USFWS Wingbee at Patuxent National Wildlife Research Refuge, March 2025.*

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